

The Spiral Enteroscopy Experience in 101 Consecutive Patients: Safety and Efficacy Using the Discovery[®] SB

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Abstract

Introduction: Spiral Enteroscopy (SE) is the use of a spiral on a rotating over-tube (Discovery SB) to pleat small bowel on the enteroscope and advance through the small bowel. Since the first procedure with the Discovery SB on a pediatric colonoscope in November 2005, 101 patients have undergone SE. The recent introduction of the Olympus 9.2mm and Fujinon 9.4mm 200cm enteroscopes with a 2.8 cm channel allowed the reduction in the diameter of the Discovery SB to 48F. Improvements in Discovery SB shaft characteristics and spiral performance have also been made.

Aims and Methods: To report the total SE experience from initial design to present. The Discovery SB over-tube is 118 cm with a 5 mm raised spiral 21 cm long on the distal end. The 57F version was used with the Olympus pediatric colonoscope and the new 48F version is used with the Fujinon 200cm 9.4mm and Olympus 200cm 9.2mm enteroscopes. 101 consecutive patients are presented. Obscure GI blood loss was the indication. All patients were outpatients. 15 patients received general anesthesia and 86 MAC with propofol, fentanyl and versed. By definition, mild mucosal trauma was limited to the mucosa and moderate mucosal trauma was limited to the submucosa. Depth of insertion was estimated by endoscopic criteria. Advancement through the small bowel was accomplished with SE pleating of small bowel and push through the Discovery SB over-tube.

Results: 52 males, 49 females, average age 45 years (19-78), average height 164cm, average weight 71.4kg. Three patients were unable to receive the procedure (1 esophageal stricture, 2 unable to intubate). The Discovery SB was used with a pediatric colonoscope (26 patients), Olympus enteroscope (25 patients) and Fujinon enteroscope (50 patients). Average depth of insertion past Ligament of Treitz (LOT) was 224cm (50-400cm), average time to maximum insertion 21.4 min., average total procedure time 32.1 min. Complications; 22 sore throats, mild mucosal damage 17 patients, moderate mucosal damage 5 patients, 3 intussusceptions all resolved during procedure. One patient was admitted after 24 hours with abdominal pain. Findings were 24 patients with avm's, 2 tumors, 4 strongyloides, 2 duodenal ulcers. Two patients with tumors had the distance past the LOT measured at surgery (280cm and 100cm) and compared to the endoscopically estimated distances (240cm and 75cm).

Conclusion: SE is a safe and effective method of visualizing the small bowel. The 48F Discovery SB with the new Fujinon and Olympus 200 cm enteroscopes is rapid and allows all usual therapies to be performed. It is preferred to the Discovery SB/ pediatric colon combination due to its decreased diameter and increased depth of insertion. Depth of insertion and procedure times compare favorably with published single and double balloon results. More studies will be needed.

A Pilot Study of Spiral Enteroscopy Using a New Design 48F Discovery SB Over-tube and the Olympus 200 cm x 9.2mm Enteroscope

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Abstract

Introduction: Intraoperative enteroscopy, double balloon enteroscopy (DBE) and single balloon enteroscopy (SBE) all use small bowel pleating techniques to visualize lengths of small bowel greater than the length of the enteroscope. Our prior studies have shown proof of concept for pleating small bowel using a spiral over-tube on a pediatric colonoscope. Here we present our results using the newly designed Discovery SB over-tube with the Olympus 200 cm, 9.2mm enteroscope (Oly ENT). The new Discovery SB has a smaller diameter (48F) and improved spiral and shaft characteristics. The Oly ENT has a longer length to improve insertion depths.

Aims and Methods: This is a pilot study presenting initial results of the newly designed Discovery SB with the Oly ENT. The Discovery SB over-tube is 48F outer diameter, 118cm long with a 5mm raised spiral at the distal end. The Olympus enteroscope (GIF) is 200cm long, 9.2mm diameter with a 2.8mm working channel. 25 consecutive patients with obscure bleeding were enrolled. MAC sedation with Propofol, Versed and Fentanyl was used. All patients were outpatients. Advancement through the small bowel was accomplished with spiral pleating, push advancement or combination technique. Withdrawal was accomplished with counter-clockwise rotation.

Results: 15 males and 10 females were enrolled. Average age was 45 years (25-68). Average height 166cm and average weight 69kg. Average total procedure time was 26.1 min. Average time to maximal depth of insertion was 16.2 min. Average estimated insertion depth past the Ligament of Treitz was 256cm (range 50-400cm) Findings were 7 AVM's, 1 tumor, 1 strongyloides. Complications were 7 sore throats that all resolved in 72 hours and one intussusception recognized and reduced during procedure. Mild mucosal trauma was seen in 5 patients and moderate mucosa trauma in 2 patients. All patients were discharged the same day of procedure. Average anesthesia use was 70 mg Propofol, 4.1 mg midazolam, and 81 mcg fentanyl. On a visual analog scale, ease of rotation was good to excellent on all patients and controlled withdrawal was very good to excellent.

Conclusion: The newly developed 48F Discovery SB over-tube with the Olympus 200 cm 9.2mm enteroscope is rapid and safe for spiral advancement through the small bowel. Depth of insertion into the small bowel compares favorably with published single balloon enteroscopy data and procedure times are superior. Controlled withdrawal was achieved in all pts. Overall, the Discovery SB/Olympus ENT combination may offer advantages compared to single balloon enteroscopy. Future studies are needed.

A Pilot Study of Spiral Enteroscopy Using a New Design 48F Discovery[®] SB Over-tube and the Fujinon 200cm x 9.4mm Enteroscope

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Abstract

Introduction: Intraoperative enteroscopy, double balloon enteroscopy (DBE) and single balloon enteroscopy (SBE) all use small bowel pleating techniques to visualize lengths of small bowel greater than the length of the enteroscope. Our prior studies have shown proof of concept for pleating small bowel using a spiral over-tube on a pediatric colonoscope. Here we present our results using the newly designed 48F Discovery SB over-tube with the Fujinon 200 cm, 9.4mm enteroscope (Fuji ENT). The new Discovery SB has a smaller diameter (48F) and improved spiral and shaft characteristics. The Fuji ENT has increased endoscope length for deeper small bowel insertion.

Aims & Methods: This is a small bowel enteroscopy pilot study using the newly designed Discovery SB with the Fuji ENT. The Discovery SB over-tube is 48F outer diameter, 118cm long with a 5mm raised spiral at the distal end. The Fujinon enteroscope (EN-450TS) is 200cm long, 9.4mm diameter with a 2.8mm working channel. 50 consecutive patients with obscure bleeding were enrolled. The distal balloon on the Fuji ENT was not used. MAC sedation was performed with Propofol, Versed and Fentanyl. All patients were outpatients. Advancement through the small bowel was accomplished with spiral pleating, push advancement or combination technique. Withdrawal was accomplished with counter-clockwise rotation.

Results: 24 males and 26 females were enrolled. Ave. age was 46 years (19-78). Average height 164cm and average weight 72kg. Average total procedure time was 29 minutes. Average time to maximal depth of insertion was 18.7 minutes. Average estimated insertion depth past the Ligament of Treitz was 243cm (range 50-380cm). Findings were 8 AVM's, 1 tumor, 2 stronglyloides. Complications were 8 sore throats that all resolved in 72 hours and one intussusception recognized and reduced during procedure. Mild mucosal trauma was seen in 5 patients and moderate mucosa trauma in 1 patient. All patients were discharged the same day of procedure. Average anesthesia use was 75 mg propofol, 4.3 mg midazolam, and 84 mcg fentanyl. On a visual analog scale, ease of rotation was good to excellent on all patients and controlled withdrawal was very good to excellent.

Conclusion: The newly developed 48F Discovery SB over-tube with the Fujinon 200 cm enteroscope is rapid and safe for advancement through the small bowel. Depth of insertion into the small bowel compares favorably with published DBE data and procedure times are superior. Controlled withdrawal was achieved in all patients. Overall, the Discovery SB/Fuji ENT combination may offer advantages compared to Double Balloon Enteroscopy. Future comparative studies are needed.

High Failure Rate of Capsule Endoscopy When Performed After Spiral Enteroscopy

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Abstract

Introduction: Spiral enteroscopy is a technique for small bowel visualization that uses an over-tube with a raised spiral on its distal end to pleat small bowel when rotated. Deep small bowel intubation is seen but the entire small bowel has not been visualized. It was our hypothesis that performing small bowel capsule endoscopy immediately after a spiral enteroscopy (SE) would allow us to see the entire small bowel. Such data may be useful to estimate depth of insertion with SE and calculate a therapeutic efficacy for the SE.

Methods: Spiral Enteroscopy was performed in standard fashion. MAC anesthesia was performed with fentanyl, versed, and propofol. Atropine was used to control oral secretions during the procedure. At the point of maximal insertion Olympus endoclips were placed. Immediately after the SE was concluded capsule endoscopy was performed. The Given Capsule was grasped with a snare and endoscopically placed past the pylorus and released. The patients then returned 8 hours later for data retrieval. Standard instructions for reinstituting peroral nutrition were given.

Results: 4 patients had both procedures performed, 2 males and 2 females. Average weight was 75kg and average height was 171cm. Average MAC anesthesia doses were versed 5mg, fentanyl 113mg and propofol 268mg. One half milligram of Atropine was given to all patients. SE results were: average total procedure time 32 minutes, average time to maximal insertion was 15 minutes. Average depth of insertion was estimated to be 300cm (distal jejunum/proximal ileum). Findings were Peutz-Jaegers (PJ), polyps in the small bowel in one patient, all were removed endoscopically. The other 3 patients had normal enteroscopies. The capsule endoscopy results were: 0/4 reached the cecum. 1/4 may have reached the ileocecal valve. Additional small bowel polyps were not seen in the PJ patient. The other 3 cases were normal. 2/4 capsule studies did not reach the maximal insertion depth as judged by visualizing the Olympus endoclips.

Conclusion: The study was halted due to inability to visualize the entire small bowel 4/4 patients. In 2/4 patients the point of maximal endoscopic insertion was not reached. The use of atropine may have negatively affected our results. In this small study the use of the capsule endoscopy immediately after spiral enteroscopy did not add to patient management and did not assist in estimating depth of endoscopic insertion or therapeutic efficacy of the spiral enteroscopy. On the basis of this study of 4 patients we would recommend not using the capsule endoscopy immediately after the procedure.

A New In Vitro Porcine Model for Spiral Enteroscopy Training: The Akerman Enteroscopy Trainer

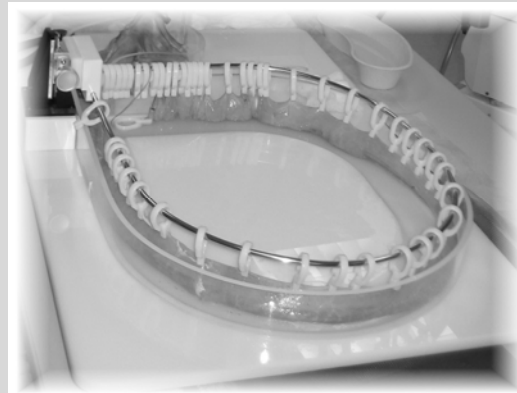
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Abstract

Introduction: Bench-top model training for enteroscopy is critical to teach techniques and concepts. The most common in vitro model for enteroscopy consists of the esophagus/stomach and 100-200cm of small bowel with mesentery removed. This model attempts to reproduce the mesentery of the small bowel to better mimic the in vivo pleating and unpleating seen in spiral enteroscopy.

Methods and Model: The Akerman Enteroscopy Trainer consists of 2 major components. The upper component corresponds to the esophagus, stomach and duodenum. The lower component corresponds to the freely mobile small bowel past the LOT. An artificial mesentery is formed with clips hanging from a curving metal rod that attaches to the mesenteric side of the small bowel along its entire length. Clips are attached every 3cm along the length of the small bowel and at the terminal end of the small bowel an elastic band is attached and gives mild resistance to pleating.



Findings: In one setting 24 trainees used the device over the course of 4 hours. The small bowel length was 130cm. Spiral enteroscopy pleating techniques for advancement and controlled withdrawal were demonstrated. The endoscopic appearance with spiral enteroscopy exactly mimics that seen in vivo. The model showed no appreciable diminution of function or performance after 4 hours of continuous use.

Conclusion: This new porcine in vitro bench-top model is very useful to demonstrate spiral advancement and pleating techniques along with counterclockwise withdrawal. The model exactly mimics the endoscopic images seen with spiral pleating enteroscopy in vivo. The model is a durable and rapid way to demonstrate SE. The model may be very useful to demonstrate other enteroscopy techniques including single and double balloon enteroscopy.